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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,539	01/18/2002	Sunao Ishizaki	NA04	7739

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 12/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/050,539

Applicant(s)

ISHIZAKI, SUNAO

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 3, 5 are rejected under 35 U.S.C. 102(e) as being anticipated over Mitsuhashi et al. (US 6273538).

Mitsuhashi et al. discloses a drive circuit for an ink jet head having nozzles (FIG. 1, element 41), pressure generating chambers (Fig. 1, element 20) filled with ink to be discharged from said nozzles and piezoelectric actuators (FIG. 1, element 12) corresponding to respective pressure generating chambers, said ink jet head discharging ink droplets from said nozzles by changing volumes of said pressure generating chambers in response to a drive waveform signal applied to said piezoelectric actuators, said drive circuit comprising:

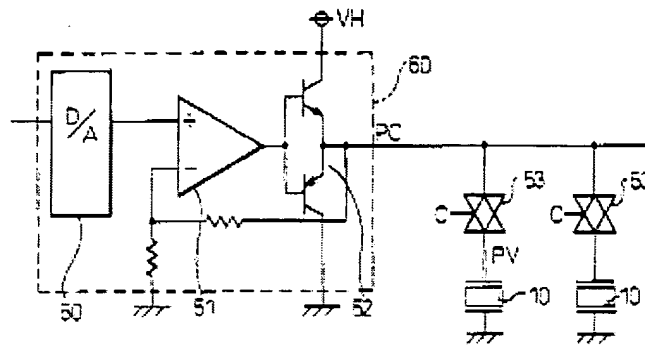
a waveform generator (FIG. 5, element 60) generating said drive waveform signal (FIG. 5);

a power amplifier (FIG. 5, element 51 and 52) amplifying said drive waveform signal supplied to a first input of said power amplifier and outputting said drive waveform signal to said piezoelectric actuators (Fig. 5);

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a feedback loop (FIG. 5: the resistor connected from the negative input of element 51 to the PC point) feeding a terminal voltage applied to said piezoelectric actuators back to a second input of said power amplifier (Fig. 5).

Fig.5



### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 4, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsuhashi et al. (US 6273538) in view of Katerberg et al. (US 5384583).

Mitsuhashi et al. discloses the claim invention as applied to claims 1, 3, 5 except that wherein said feedback loop includes a capacitor producing a lead to phase singal in a high frequency range.

However, Katerberg et al. discloses that wherein said feedback loop includes a capacitor producing a lead to phase singal in a high frequency range (FIG. 2, element 40).

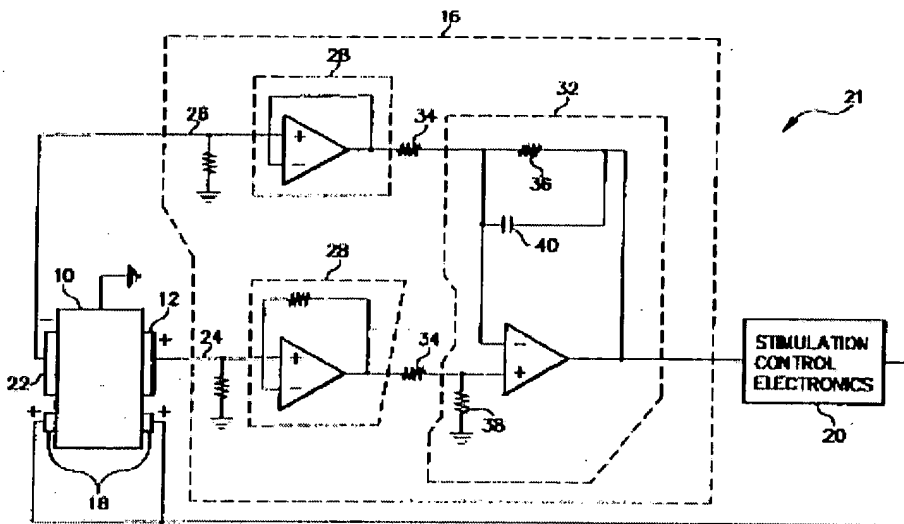


FIG. 2

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to include such capacitor as disclosed by Katerberg et al. into the feedback circuit of the driving circuit disclosed by Mitsuhashi et al. The motivation of doing so is to prevent the self-oscillation of the amplifier in order to gain the stability of the operation of the amplifier as taught by Katerberg et al. (column 3, line 55-60).

4. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isamoto (US 6334668) in view of Katerberg et al. (US 5384583).

Isamoto discloses a drive circuit of an ink jet head of a serial type ink jet printer, which includes a carriage mounting nozzles (FIG. 7A) and pressure generating chambers and in which ink droplets are jetted from the nozzles by sharply changing volumes of said pressure generating chambers (FIG. 13A, element 234) filled with ink by applying drive waveform signal to piezo-electric actuators (FIG.13A, element 239) provided corresponding to said respective pressure

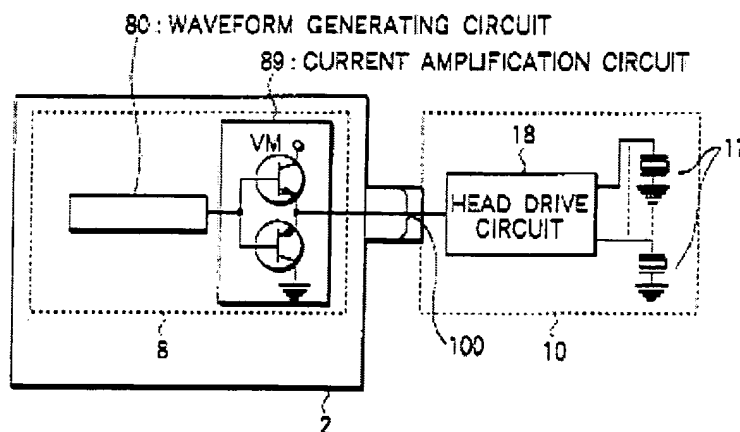
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generator chambers while moving said carriage reciprocally in a direction perpendicular to a feeding direction of a printing sheet (FIG. 1), comprising:

a control circuit board (FIG. 12, element 2) including a waveform generator (FIG. 1, element 80) generating a signal for driving said ink jet head, a power amplifier (FIG. 12, element 89) amplifying the output signal of said waveform generator, an image memory storing printing data (FIG. 8, element 4-5), and a data transmitter for transmitting the image data stored in said image memory as a serial data thereon (FIG. 1, element 9);

an intermediate circuit board (FIG. 11A, element 18) mounted on said carriage, said intermediate circuit board including a data receiver (FIG. 11A, element 13) receiving said serial data from said data transmitter, transfer gates (FIG. 11A, element 160) selecting piezoelectric actuators (FIG. 11A, element 17) on the basis of said received printing data and a level shifter (FIG. 11A, element 160) matching voltage levels from said data receiver to respective transfer gates thereon;

a cable connecting said control circuit board and said intermediate circuit board each other (FIG. 12, element 100);



Isamoto does not disclose a negative feedback loop including a resistor and a capacitor.

However, Katerberg et al. disclose a negative feedback loop including a resistor (FIG. 2, element 36) and a capacitor (FIG. 2, element 40) to prevent oscillation of the amplifier (column 3, line 55-59).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to include such negative feedback loop as disclosed by Katerberg et al. into the driving circuit disclosed by Isamoto. The motivation of doing so is to prevent the undesired oscillation of the amplifier in order to gain the stability of the operation of the amplifier as taught by Katerberg et al. (column 3, line 55-59).

#### ***Response to Arguments***

Applicant's arguments filed September 30, 2002 have been fully considered but they are not persuasive.

**Regarding to the argument on page 5-6 referring to claims 1, 3,5:** The applicant argued that the Mitsuhashi et al. reference fails to disclose that the voltage applied to the terminals of the piezoelectric actuators is not fed back to operational amplifier. However, as discussed above, the voltage applied to the terminals of the piezoelectric actuators is fed back to operational amplifier through the resistor in FIG. 5. Therefore, these claims are rejected under the teaching of the prior art.

**Regarding to the argument on page 6 referring to claims 2, 4, 6:** Since these claims are dependent on the rejected claims 1, 3, 5 and are rejected under the combination of Mitsuhashi et al. and Katerberg et al., these claims are also unpatentable.

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**Regarding to the argument on page7 referring to claims 7, 8:** The applicant argued that the Mitsuhashi et al. and Katerberg et al. references fail to disclose a negative feedback loop including a resistor and a capacitor. However, as discussed above, the combination of Isamoto and Katerberg et al. references discloses this negative feedback loop. Therefore, these claims are disclosed by the prior arts.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BARLOW can be reached on (703)308-3126. The fax phone numbers for



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the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN

December 12, 2002

  
**John Barlow**  
**Supervisory Patent Examiner**  
**Technology Center 2800**